

INDUSTRIAL EFFLUENT DISCHARGE SAMPLING

RMRS/OPS-PRO.083

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Manager, Surface Water

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ADMIN RECORD

1. PURPOSE

The purpose of this procedure is to describe the techniques and methods used for the collection of industrial effluent discharge samples at the Rocky Flats Environmental Technology Site (RFETS). Proper sampling is necessary to ensure that the collection of representative samples meets applicable regulations and appropriate sampling protocols as specified by the Clean Water Act (CWA).

Under the authority of the National Pollutant Discharge Elimination System (NPDES) program, established by Section 402 of the CWA, the EPA and the State of Colorado have promulgated regulations for monitoring liquid effluent discharges. A permit was issued to the Site to discharge to the receiving waters of South Walnut Creek, North Walnut Creek, and Woman Creek with control on the conditions and limits under which discharge may take place. In addition, the Department of Energy (DOE) Order 5400.1 specifies that compliance with NPDES program requirements is mandatory for DOE operations. The DOE Order also states DOE policy "to conduct its operations in an environmentally safe and sound manner" and requires monitoring of effluent discharges and ambient water quality.

Included in this procedure are personnel responsibilities and qualifications, quality assurance/quality control (QA/QC), and documentation requirements that will be used for collection activities in order to attain acceptable standards of accuracy, comparability, precision, representativeness, and completeness.

2. SCOPE

This procedure addresses the industrial effluent discharge specified in the current NPDES permit, but is applicable to the collection of samples from all industrial effluent discharges at RFETS.

3. RESPONSIBILITIES AND QUALIFICATIONS

All personnel performing these procedures are required to have the appropriate health and safety training as specified in the site-specific Health and Safety Plan and project specific Health and Safety Plan. In addition, all personnel are required to have a complete understanding of the procedures described within this procedure and receive specific training regarding these procedures, if necessary.

Personnel performing industrial effluent discharge sampling activities will be geologists, hydrologists, engineers, or field technicians with an appropriate amount of applicable field experience or on-the-job training under supervision of another qualified person.

4. REFERENCES

4.1 Source References

The following is a list of references reviewed prior to the writing of this procedure:

MCD-51, NPDES Compliance Inspection Manual. U.S. Environmental Protection Agency. May 1988.

Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. 3rd Edition. U.S. Environmental Protection Agency EPA/600/4-85/013. March 1985.

Region VIII USEPA NPDES Acute Test Conditions-Static Renewal Whole Effluent Toxicity, 1985.

Code of Federal Regulations. 40 CFR parts 122, 123, 125, 133, and 136.

Methods for Chemical Analysis of Water and Waste. U.S. Environmental Protection Agency 1979.

DOE Order 5400.1. U.S. Department of Energy Environmental Safety and Health Directive. November 1988.

4.2 Internal References

Rocky Flats Plant NPDES Permit No. CO-0001333, 1984.

Rocky Flats Plant NPDES Federal Facilities Compliance Agreement, 1991.

RF/RMRS-98-200, *Evaluation of Data for Usability in Final Reports*.

Related SOPs cross-referenced by this procedure are as follows:

- SOP FO.3, *General Equipment Decontamination*
- SOP FO.13, *Containerizing, Preserving, Handling, and Shipping of Soil And Water Samples*
- SOP FO.14, *Field Data Management*
- 5-21000-OPS-SW.02, *Field Measurements of Surface Water Field Parameters*
- 5-21000-OPS-SW.03, *Surface Water Sampling*

5. PROCEDURE

5.1 Sample Collection And Preservation

Collection of representative effluent samples requires that a reliable procedure be developed and implemented. Since each effluent location may have conditions or requirements that make it unique, each location must be evaluated on a site-by-site basis. This procedure addresses criteria for effluent sampling, including sampling necessary to meet the requirements of NPDES Permit No. CO-0001333, as modified by the 1990 NPDES FFCA.

Surface Water samples will be collected following 5-21000-OPS-SW.03, *Surface Water Sampling*. Composite samples will be collected with an automatic sampler following manufacturer's instructions for its operation. Sampling sites will be located at the points specified in the NPDES permit. Parameters measured in the field will comply with 5-21000-OPS-SW.02, *Field Measurements of Surface Water Field Parameters*.

5.2 Sample Custody, Preservation And Handling

Sample containers used for sampling will be prepared and handled as described in SOP FO.13, *Containerizing, Preserving, Handling and Shipping of Soil and Water Samples*. Precleaned sample containers will be purchased from a commercial laboratory supplier or provided by analyzing laboratories. Table SW.9-1 lists containers, preservatives, and holding times for NPDES samples. These requirements are based on 40 CFR 136 and regulations governing the collection of NPDES samples, which will take precedence over any conflicting information given in other guidance or procedure when collecting NPDES samples.

5.3 Grab And Composite Sampling

Samples will be collected as either grab or composite samples, as specified by the NPDES permit, and/or the NPDES FFCA.

Surface water grab samples will be collected as required by 5-21000-OPS-SW.03, *Surface Water Sampling* with attention given to certain parameters, such as oil and grease, which must be collected by sample container immersion, while others may be collected by the "dip and transfer" method. Volatile organics and fecal coliform will be collected by sample container immersion whenever possible. Discrete grab samples will be collected upstream of the point where the sample technician is standing.

To comply with the selected permit conditions, flow proportional composites will be sampled as required, using automatic flow-proportional composite samplers. These samplers will be operated according to manufacturer's instructions.

Manually composited individual grab samples will be thoroughly mixed prior to removing an aliquot to ensure that a representative sample is transferred to a container for analysis. Sample manipulation will be minimized to reduce the possibility of contamination.

Table SW.9-1 Containers, Sample Preservation and Sample Holding Times			
Parameter	Container	Preservatives	Holding Time
HSL-VOAs	2x40 mL vials with Teflon lined septum lids	Cool 4°C(a) or with HCL to pH<2	7 days 14 days
Total Organic Carbon	125 mL - Glass Bottle	H ₂ SO ₄ to pH<2	28 days
Biochemical Oxygen Demand ₅ (BOD ₅)	1 L - Glass(b)	Cool 4°C	48 hours
Biochemical Oxygen Demand Carbonaceous ₅ (CBOD ₅)	1 L - Glass(b)	Cool 4°C	48 hours
Fecal Coliform	500 mL - Glass or Poly (sterile)	Cool 4°C(a)	6 hours
Oil and Grease	2x1 L - widemouth glass with teflon liner	Cool 4°C H ₂ SO ₄ to pH<2	28 days
Solids-Total NVSS	500 mL - Poly(c)	Cool 4°C(a)	7 days
Nitrate/Nitrite (as N) and Ammonia (as N)	500 mL - Poly	Cool 4°C H ₂ SO ₄ to pH<2	28 days
HSL Metals-Total Rec/Total	1 L - Poly	HNO ₃ to pH<2	6 months (d)
Chromium-Total Rec	1 L - Poly	HNO ₃ to pH<2	6 months
Phosphorous-Total	250 mL - Glass	Cool 4°C H ₂ SO ₄ to pH<2	28 days
Whole Effluent Toxicity (WET) Testing	1 gallon Poly (e)	Cool 4°C(a)	48 hours
pH, temperature, Total Residual Chlorine	In-situ; poly, glass or metal container	None	Analyze Immediately
Gross Alpha/Beta	1 L-poly	Cool 4°C HNO ₃ to pH<2	6 mos.
Isotopic radiochemistry	4 L-poly	Cool 4°C HNO ₃ to pH<2	6 mos.
Tritium	250 ml-poly	Cool 4°C	6 mos.
Rad Screen	250 ml-poly	Cool 4°C	N/A

Notes: * Add 0.008% Sodium thiosulfate (Na₂S₂O₃) in the presence of residual chlorine.

* Poly bottles may be substituted if glass bottles are not available.

* Glass bottles may be substituted if polyethylene bottles are not available.

* Holding Time for mercury is 28 days.

* Amount is for Ceriodaphnia and Pimephales promelas test.

5.4 Whole Effluent Toxicity (WET) Testing

Whole effluent toxicity monitoring will be conducted at several effluent locations as required by the NPDES/FFCA. Acute replacement static toxicity tests will be conducted in conformity with "Methods for Measuring the Acute Toxicity of Effluent to Freshwater and Marine Organisms", USEPA 600/4-85/013 (revised March 1985) and the Region VIII USEPA "NPDES Acute Test Conditions - Static Renewal Whole Effluent Toxicity". USEPA Region VIII procedures will take precedence in case of any conflicts.

6. QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality Assurance (QA) and Quality Control (QC) will be accomplished according to applicable project plans as well as quality requirements presented in this procedure. Additional QA/QC requirements may be added if it is determined they are needed to ensure the quality of the data. Data needs will be evaluated in accordance with RF/RMRS-98-200, *Evaluation of Data for Usability in Final Reports*.

The most common monitoring errors are typically the result of improper sampling, improper preservation, and exceeding sample holding times. Errors of this type will be minimized by the use of this procedure which addresses all of these issues and through the training provided for the technicians.

The three types of QC samples to be collected are:

- Duplicate
- Rinsate samples
- Split samples

6.1 Field Duplicate Samples

Field duplicate samples are independent samples collected from the same source, so they are, to the extent possible, equally representative of the parameter(s) of interest at a given point in time.

6.2 Equipment Rinsate Samples

Equipment rinsate samples are samples that are obtained by pouring analyte-free distilled water through decontaminated sample collection equipment (dipper, compositing container, pump, etc.) and collecting the rinsate in the appropriate container for chemical analysis. These samples are used to determine the effectiveness of the decontamination procedures.

6.3 Split Samples

Split samples involve collecting a single sample and dividing the sample into two containers for analysis by separate laboratories. While infrequently employed, split samples are beneficial in identifying problems and discrepancies within the analytical laboratories.

6.4 QA/QC Sample Frequencies

Matrix spike and matrix spike duplicate analyses are run as internal lab checks and frequencies will be determined by analytical laboratory procedures. Equipment rinsates and sample duplicates will be collected at a minimum frequency of one per 20 field samples. Split samples are collected at a frequency similar to duplicates and rinsates or at least once each year.

6.5 Field Instrument Calibration

Field instruments will be calibrated in accordance with 5-21000-OPS-SW.02, *Field Measurements of Surface Water Field Parameters*.

7. DOCUMENTATION

Proper chain of custody and documentation will be maintained at all times by following SOP FO.13, *Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples*. A permanent record of the implementation of this procedure will be kept by documenting field observations and data. Observations and data will be recorded on daily NPDES log sheets that identify the required data entries or in a bound field notebook with consecutively numbered pages. Field logbooks will generally be utilized to summarize the daily field activities and to document project information not required by the field forms.

Permanent ink will be used for all entries in the logbooks and on the field forms. Mistakes will be crossed out with a single line, initialed, and dated. Unused pages or partial pages will be voided by drawing a line through the blank sections and initialing. Any deviation from this procedure requires documentation in the site supervisor's logbook.

The field activity daily log narrative should create a chronological record of the media team's activities, including the time and location of each activity. Any descriptions of problems encountered, personnel contacted, deviations from the procedure, and visitors on site should also be included. The weather conditions, date, signature of the person responsible for entries, and the number of field activity daily log sheets used to record media team activities for a given day will also be included.

Sample identification and data handling will conform to SOP FO.14, *Field Data Management*.

8. RECORDS

The following documents generated during the performance of this procedure must be controlled as follows:

<u>Document</u>	<u>Record Type</u>	<u>Disposition</u>
Chain-of-Custody	QA	<ul style="list-style-type: none">• Original to analyzing lab• Copy to project manager• Copy to RMRS Record Center
Surface Water Field Collection Form (Current Version)	QA	<ul style="list-style-type: none">• Original to project manager• Copy to sample collection staff• Copy to RMRS Record Center